1 Description of the model. Field theoretic formulation

$$S_0(\mathbf{v}', \mathbf{v}, \psi, \psi^\dagger) = \psi^\dagger[-\partial_t-(\mathbf{v}\nabla)-a_0(\nabla\mathbf{v})+D_0\nabla^2-D_0\tau_0]\psi+\frac{D_0\lambda_0}{2}[(\psi^\dagger)\psi-\psi^\dagger\psi^2]-\frac{1}{2}\mathbf{v}D_v^{-1}\mathbf{v}+\frac{u_{20}}{2D_0}\psi\psi \tag{1}$$

$$< v_i(t,x)v_j(t',x') >= \int \frac{d\omega dk}{(2\pi)^{d+1}}(P_{ij}^{\perp} + \alpha P_{ij}^{\|})D_v(\omega, k)e^{-i\omega(t-t')+ik(x-x')} \tag{2}$$

$$D_v(\omega, k) = \frac{u_{10}g_{10}D_0^3k^{4-d-2\varepsilon-\eta}}{\omega^2 + u_{10}^2D_0^2(k^{2-\eta})^2} \tag{3}$$

Feynman rules.

$$< \psi, \psi^\dagger >= (i\omega + D_0(k^2 + \tau))^{-1} \tag{4}$$

$$< \psi^\dagger, \psi >= (-i\omega + D_0(k^2 + \tau))^{-1} \tag{5}$$

$$< v_i, v_j >= u_{10}g_{10}D_0^3k^{4-d-2\varepsilon-\eta}(P_{ij}^{\perp} + \alpha P_{ij}^{\|})(\omega^2 + u_{10}^2D_0^2k^{4-2\eta})^{-1} \tag{6}$$

$$< \psi, \psi, \psi^\dagger >= D_0\lambda_0 \tag{7}$$

$$< \psi, \psi^\dagger, \psi^\dagger >= -D_0\lambda_0 \tag{8}$$

$$< \psi, \psi^\dagger, v_i >= -ik_i - ia_0q_i \tag{9}$$

k- momentum of the ψ, q- momentum of the v.

$$< \psi, \psi^\dagger, v_i, v_j >= \frac{u_{20}}{D_0}\delta_{ij} \tag{10}$$

2 Canonical dimensions, UV divergences and the renormalization

New constant $g_{20} = \lambda_0^2$. $d = 4 - 2\delta$

F	ψ	$\psi^\dagger$	v	D_0	τ_0	λ_0	g_{10}	g_{20}	u_{10}	u_{20}
d_F^k	$\frac{d}{2}$	$\frac{d}{2}$	-1	-2	2	δ	2ε	2δ	η	0
d_F^ω	0	0	1	1	0	0	0	0	0	0
d_F	$\frac{d}{2}$	$\frac{d}{2}$	1	0	2	δ	2ε	2δ	η	0